Phillips, L.D.
1945

Service
Paper

An analysis and classification of the questions and exercises in ten fourth grade geography books on the basis of the higher mental processes required for their solution

BOSTON UNIVERSITY
SCHOOL OF EDUCATION
LIBRARY
Ed.
Service Paper
Phillips, L. D.
1945
The Gift of Laura D. Phillips

Service
Paper
Phillips, L.
1945

BOSTON UNIVERSITY

SCHOOL OF EDUCATION

AN ANALYSIS AND CLASSIFICATION OF THE QUESTIONS AND EXERCISES IN TEN FOURTH GRADE GEOGRAPHY BOOKS ON THE BASIS OF THE HIGHER MENTAL PROCESSES REQUIRED FOR THEIR SOLUTION

Submitted by

Laura Dorothy Phillips

(B.S. in Ed., Boston University, 1944)

In partial fulfillment of requirements for
the degree of Master of Education

1945

✓

First Reader: W.Linwood Chase, Professor of Education

Second Reader: Helen A. Murphy, Assistant Professor of Education

Third Reader:

Boston University
School of Education
Library

School of Education
August, [illegible]
26142

ACKNOWLEDGMENT

The writer wishes to acknowledge her indebtedness to Dr. Donald D. Durrell, Dean of the School of Education, Boston University, for his help and guidance in planning this study; and to Dr. W. Linwood Chase, Professor of Education, Boston University, School of Education, for his help in carrying it to completion.

Digitized by the Internet Archive
in 2015

https://archive.org/details/analysisclassifi00phil

AN ANALYSIS AND CLASSIFICATION OF THE QUESTIONS AND EXERCISES IN TEN FOURTH GRADE GEOGRAPHY BOOKS ON THE BASIS OF THE HIGHER MENTAL PROCESSES REQUIRED FOR THEIR SOLUTION

TABLE OF CONTENTS

Chapter		Page
INDEX TO TABLES		ii
I	PURPOSES OF THE STUDY	1
II	RELATED STUDIES	5
III	PROCEDURE USED IN THE STUDY	19
IV	ANALYSIS OF DATA	29
V	SUMMARY AND CONCLUSIONS	68
	BIBLIOGRAPHY	71

INDEX TO TABLES

TABLE PAGE

IA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL.................................... 30

IIA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER SUB-DIVISIONS OF ORGANIZATION OF IDEAS............................ 32

IIIA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS.............. 34

IVA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS............. 36

IB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISION OF RECALL.................................... 38

IIB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS......................... 40

IIIB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS.............. 42

IVB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS............. 43

INDEX TO TABLES (Continued)

TABLE PAGE

VA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL..... 45

VIA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS.............................. 47

VIIA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS.................................. 49

VIIIA NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS................ 51

VB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS,,PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL.... 53

VIB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS.............................. 55

VIIB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS................. 57

VIIIB PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS............................. 59

IXA NUMERICAL DISTRIBUTION OF THE QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS UNDER THE MAIN CLASSIFICATIONS.......... 60

IXB PERCENTAGE DISTRIBUTION OF THE QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS UNDER THE MAIN CLASSIFICATIONS.......... 61

INDEX TO TABLES (Continued)

TABLE PAGE

XA NUMERICAL DISTRIBUTION OF THE QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS UNDER THE MAIN CLASSIFICATIONS.................. 62

XB PERCENTAGE DISTRIBUTION OF THE QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS UNDER THE MAIN CLASSIFICATIONS.................. 63

XIA NUMERICAL DISTRIBUTION OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES UNDER THE MAIN CLASSIFICATIONS................................ 64

XIB PERCENTAGE DISTRIBUTION OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES UNDER THE MAIN CLASSIFICATIONS................................ 65

XII NUMERICAL AND PERCENTAGE DISTRIBUTIONS OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES IN THE TEN BOOKS USED IN THIS STUDY............. 67

CHAPTER I

PURPOSES OF THE STUDY

This study was undertaken for the following purposes:

1. to classify the questions and exercises in fourth grade geography books on the basis of the mental processes required to answer the questions and to do the exercises;
2. to learn to what extent the questions and exercises in fourth grade geography books require the use of higher mental processes, as defined in this study.

The writer of the study is of the opinion that such knowledge would be of practical value to teachers, administrators, textbook writers, and others who are concerned with guiding children to their maximum mental development.

DEFINITION OF TERMS

Mental Processes:

In this study the term mental processes is used to mean those mental activities in which children engage in order to answer the questions and to do the exercises set for them in fourth grade geography books.

Higher Mental Processes:

The term higher mental processes is used in this study to designate those mental activities included in this study other than recall, namely: organization of ideas; supplementation and use of ideas; and criticism and evaluation of ideas.

Need of Ability to Think:

John Dewey once wrote: "The most we may do for children as far as their minds are concerned is to teach them to think."

The Times Education Supplement[1] states, "The teaching of clear thinking is one of the most urgent needs of our time. As the scale of social organization increases the guidance of our instincts becomes more and more unsafe, and the need for ordinary man to have a clear consciousness of his actions, and to form a strong habit of forecasting their results becomes ever more apparent."

In a democracy it is imperative that the people develop the ability to think for themselves, and to act for themselves on the basis of their thinking. Facts and principles learned are then not ends in themselves, but tools for thinking. "Education is ineffective if it does not provide

---

[1] "Education and Social Reconstruction: Need to Teach Clear Thinking." Times Education Supplement, 1511: 183. April 15, 1944.

experiences to develop higher mental processes."[2]

Levels of Mental Activity:

Formerly it was assumed that education was chiefly the acquisition of information. Although the emphasis has changed in modern education, and the mere acquisition of facts is not now recognized as education, it must not be underrated, as information is the basis upon which thinking depends. One cannot think without knowledge of the facts. Judd states, "Memorization of facts frequently fails to result in the development of higher mental processes. If the higher mental processes.....are really to be cultivated, learning conditions appropriate for their cultivation are necessary."[3] Many students develop facility in one type of mental activity involved in a course without developing equal facility in other types of mental processes involved."[4] Judd considers memorization, or recall, a low grade of mental activity. The ability to learn and the ability to think are related, but are not identical. Mere repetition

---

[2] J. Paul Leonard and Alvin C. Eurich, (Editors). An Evaluation of Modern Education. (A Report Sponsored by the Society for Curriculum Study.) (New York: D. Appleton-Century Company, 1944), p. 126.

[3] Charles Hubbard Judd. Education as Cultivation of the Higher Mental Processes (New York: The Macmillan Company, 1936), p. 17.

[4] Idem, p. 15.

may result in learning, while reasoning requires the reorganization and application of isolated facts learned. Reasoning requires a greater degree of intellectual development than does mere ability to learn. Critical or reflective thinking involves a higher order of intellectual development, in which the ability to reason is included."[5]

From the foregoing it is apparent that the existence of different degrees or levels of mental activity is recognized and accepted. Therefore, the writer considers the term "higher mental processes" justifiable for the purposes of this study.

---

[5] Edward M. Glaser. An Experiment in the Development of Critical Thinking. Contributions to Education, No. 843, Bureau of Publications, Teachers College, Columbia University, 1941. p. 37.

CHAPTER II

RELATED STUDIES

Little research having direct relationship to this study was found. However, the following studies as reported by Deutsche[1] are related to some phase of children's thinking.

Jean Piaget's study of the thought processes of children, especially of logical thinking and reasoning, is the pioneer work in the field. His study resulted in a classification of children's concepts of causality, including several types of causal explanations, representing three stages of development. These three stages of causal thinking progress from egocentrism to socialization in the child. Piaget used the individual, direct-questioning method, sometimes with experiments and demonstration, to learn children's ideas of such natural forces as water current, the movement of clouds and heavenly bodies, and shadows. He also studied children's understanding of the mechanism of bicycles, steam engines, trains, automobiles and airplanes. He found that true concepts of causality did not appear until children were about seven or eight years old.

The methods Piaget used, as well as his results and

---

[1] Jean Marquis Deutsche. The Development of Children's Concepts of Causal Relations, (Minneapolis: The University of Minnesota Press, 1937).

conclusions have been criticized, but his work did contribute a technique for attacking the problem of children's thinking, and furnished the basis for further work.

A study by Keen on the growth of concepts and reasoning gave evidence that reasoning is specific to the situation, and not a general ability. She found differences between subjects of different ages in the amount of previous knowledge and experience upon which they have to draw, and in the organization of that information. She concludes that there is a gradual development of the reasoning process, through more effective organization of concepts and the growth of self-criticism.

Hazlitt, in a study on children's thinking used the procedure in which children recognized exceptions and found a common object. She concludes that children can see relationship at a very early age.

Winch found a high correlation between reasoning ability, or ability to find flaws in statements, and age; and a high correlation between reasoning ability and intelligence.

Bedell studied the ability of children to recall and to generalize. She found no sex difference in ability to recall, but that boys excel girls in ability to generalize.

Deutsche[2] used the group testing technique in a study

---

[2] *Idem.*

of the development of causal relations. Seven hundred thirty-two children in grades three to eight were the subjects. Conclusions of the study of interest here are: The overlapping between ages in types of answers was marked. No type of answer was characteristic of a single age.

A striking increase of superior answers was found with advancing age.

No evidence was found that children's reasoning ability develops by stages. Analysis shows a gradual development in ability to answer correctly cause and effect questions.

Burt[3], in a study in which he used especially devised tests to measure the reasoning ability of school children between seven and fourteen years of age concluded that all of the elemental mechanisms essential to formal reasoning are present in children at the age of seven, if not somewhat earlier. Development consists primarily in an increase in the extent and variety of the subject matter to which those mechanisms can be applied, and in an increase in the precision and elaboration with which those mechanisms can operate.

---

[3] C. Burt, "The Development of Reasoning in School Children," *Journal of Experimental Pedagogy*, 5: 67-77 +, 1927. Cited by Edward M. Glaser, *An Experiment in the Development of Critical Thinking*, *Contributions to Education No. 843.* (New York: Columbia University, Bureau of Publications, 1941). pp. 212.

Jensen[4] confirms Burt's findings, and states that the thought processes of children are not qualitatively different from those of adults.

Raths[5] conducted an experiment to test children's thinking. Tests were scored for correct judgments of true, false, and questionable statements. Three kinds of errors were found:

1. errors due to ignorance;
2. errors due to over-caution or uncertainty;
3. errors in which the child goes beyond facts when the evidence is insufficient.

The following studies concern reading ability and some mental process.

Grim[6] concluded that the pupil who rates high in reading ability may or may not stand equally high in his ability to interpret social data. The study indicated that reading

---

[4] Kai Jensen "The Social Studies." Thirty-Eighth Yearbook of the National Society for the Study of Education, Part I Bloomingdale, Illinois: Public School Publishing Company, 1939). pp. 325-360.

[5] Louis Raths, "A Thinking Test," Educational Research Bulletin, 23: 72-75 + , March 15, 1944.

[6] Paul R. Grim, "Interpretation of Data and Reading Ability in the Social Studies", Educational Research Bulletin, 19: 372-4, September 25, 1940.

ability and ability to interpret data are related in the social studies, but not definitely enough to consider them as a single behavior. Both are important objectives of the social studies, and the author concluded that each should be evaluated with a separate test or technique.

The study by Gans[7] was undertaken for the purpose of learning the ability of children in grades four, five, and six to read critically to find information relevant to a problem under consideration; and to learn the degree to which this ability is related to comprehension. The author anticipated the criticism that the ability to recognize relevant material is thinking rather than reading, and stated that for comprehension in reading there must be thinking, and that reading comprehension is not regarded as a simple skill, but as one of the higher mental processes.

Children were asked to judge the relevancy of material read to the problem to be solved as relevant, remotely relevant, fanciful, encyclopedic, and sheerly irrelevant; also, as material that helps or does not help to solve the problem.

The study showed that reference reading is a composite ability which includes reading ability, selection-rejection

---

[7] Roma Gans, Critical Reading Comprehension in Intermediate Grades, Contributions to Education No. 811. (New York: Columbia University, Bureau of Publications, 1940).

ability, and shows some influence of delayed recall. The author concludes that general reading comprehension is being developed in our schools with no regard for the wisdom of accepting the printed word.

Marden's[8] study has as its purpose the measurement of the extent to which the "average" seventh grader practices associational thinking while reading in the social studies field, and to determine in how far growth in power would result from directed teaching of this associational reading. Associational reading, as used in this study, is associational thinking as an end result.

The process of associational reading was broken down into specific abilities used with social studies literature, as follows:

1. stimulation to self-expression through activity, and questioning for further research;
2. use of experiential knowledge to illustrate a specific idea;
3. use of experiential knowledge to illustrate a generalization.

A test was built to measure these abilities.

---

[8] Avis Marden, Associational Reading Abilities of the Seventh Grader. Unpublished Master of Education Thesis, Boston University, 1941.

Preliminary examination of test results showed that pupils had little ability in some phases of associational reading. A control and an experimental group were given instruction in associational reading for a ten-week period and then retested.

Results of the study show, in part, that pupils are able to improve their ability to suggest activities related to their reading; pupils made greater gains in suggesting activities classified as "Creative", than they did in the "Manipulative" or "Intellectual" categories. The study suggests that the ability to suggest related activities may be taught to all pupils with some degree of success, and that the ability depends more upon specific training than upon mental ability. Further conclusions are that pupils are able to improve their ability to raise questions for further study related to their reading, and to use experiential knowledge for the illustration of a specific idea presented in their reading.

Several other studies agree with that of Marden in that certain abilities improve as the result of directed practice, or of teaching.

Glaser's[9] experiment was conducted in twelfth grade English classes. There were four classes in both the control

---

[9] Edward M. Glaser, "An Experiment in the Development of Critical Thinking, Contributions to Education No. 843. (New York: Columbia University, Bureau of Publications, 1941).

and the experimental groups. The objectives of the experimental teaching were:

1. to cultivate in the pupils an attitude of reasonableness, a disposition to consider in a thoughtful way the problems and subjects that come within the range of one's experience;
2. to help students acquire some knowledge of the methods of logical inquiry and reasoning; and
3. to help students acquire some skill in applying those methods.

A series of eight lesson units was developed for use in the experimental classes over a ten-week period. The control classes followed the usual course of study for their schools, which included among objectives the development of the ability to think critically. Initial and final tests in critical thinking were administered.

Results of the experiment showed significantly greater gains in the critical thinking tests in the experimental classes. There was evidence of increased disposition and ability to think critically in other school classes, at home, in personal problems, and in connection with speeches, advertisements, and arguments. Most subject to general transfer was the attitude of wanting evidence for beliefs. Development of skill in logical inquiry and reasoning appears to be limited by the acquisition of knowledge and facts concerning the subject matter or problem toward which the

thinking is directed.

There is a tendency for the more intelligent members of a group to profit most from the training in critical thinking. However, this is only a group trend. Individuals with I.Q.'s of less than 100 are found among those who profit most from such training.

A study by Anderson, Marcham, and Seymour[10] was carried on in the social studies field in grades seven and ten. Emphasis was placed on the following skills involved in critical thinking:

1. identifying specific facts;
2. selecting relevant facts;
3. organizing facts in terms of meaningful sub-topics;
4. arranging sub-topics in logical order;
5. making inferences from specific facts and from trends;
6. distinguishing between fact and opinion;
7. recognizing situations in which insufficient evidence makes it difficult or impossible to draw a clear-cut conclusion.

Objective-type tests were devised at each grade level to measure the skills stressed in the experimental materials. Classes were paired, tested in September and again in April

---

[10] Howard C. Anderson, *et al.*, "An Experiment in Teaching Certain Skills in Critical Thinking", *Journal of Educational Research*, 38: 241-51, December, 1944.

after instructional materials had been used with the experimental group.

In Abstracting and Organizing Information there was little difference between the two groups. In Making Inferences and Drawing Conclusions the gains made by the experimental group were decidedly higher.

An experiment by Arnold[11] in teaching and testing use of data, or the ability to do critical thinking was carried out with fifth and sixth grade pupils. One purpose of the experiment was to gather data as to the possibility and the methods of teaching more intelligent use of data to pupils in grades five and six. An experimental and a control group were used. The experimental group was given instruction in the abilities tested, and both groups were retested. Conclusions of the study were that the intelligent use of data can be tested at the fifth and sixth grade level, and that critical thinking can be taught in the elementary school whenever time is taken to give adequate consideration to our purposes and procedures.

A study by Wrightstone[12] agrees with the above. In this study a series of tests was constructed to test the

---

[11] Dwight L. Arnold, "Testing Ability to Use Data in the Fifth and Sixth Grades", Educational Research Bulletin, 17: 255-59+, December 7, 1938.

[12] J. Wayne Wrightstone, Appraisal of Newer Elementary School Practice, (New York: Columbia University Press, 1938). pp. 221.

effectiveness of the teaching of critical thinking in the elementary schools. The tests were constructed especially to test the ability of the pupils to:

1. obtain facts;
2. interpret facts;
3. apply the conclusion to new or special situations.

For the most part the content of the tests was related to aspects and materials of social education. Scores were not statistically significant, but definitely favored the experimental schools in which critical thinking had been made a major objective of teaching. The conclusion, in terms of educational significance, is that the quality of pupil thinking can be improved by proper instruction and by provision for its practice.

A study by Salisbury[13] conducted in grades seven, nine, and twelve concluded, in part, that mental skills involved in outlining and summarizing transfer to produce improvement in general thinking or reasoning ability. Training in logical organization appears to be somewhat more successful if carried on intensively during a short period of time than if given intermittently over a longer period. Improvement in thinking can be achieved under normal classroom conditions when the pupils are given

---

[13] Rachael Salisbury, "A Study of the Transfer Effects of Training in Logical Organization", Journal of Educational Research, 28: 241-254, December, 1934.

directed practice in outlining and summarizing.

In an experiment with ninth grade pupils in algebra, Daily[14] found that direct instruction in the development of critical thinking is of considerable value.

Teller[15] found that the experimental group in which time was devoted to group thinking in the interpretation of historical data showed greater improvement in ability to interpret data, and also developed a more critical attitude toward present day problems than did the control group.

Symonds[16] conducted an experiment to discover the mental processes that are required in different types of thought processes. He met with a group of graduate students in education for one evening a week for the greater part of a school year. At the meetings Symonds presented the group with questions intended to stimulate one type of mental process. Each member of the group attempted to report the mental process he went through to reach his solution of the problem.

---

[14] B. W. Daily, Ability of High School Pupils to Select Essential Data in Solving Problems, Contributions to Education No. 190. (New York: Columbia University, Bureau of Publications., 1925.)

[15] J. D. Teller, "Improving Ability to Interpret Educational Data", Educational Research Bulletin, 19: 363-71. 1940.

[16] Percival M. Symonds, Education and the Psychology of Thinking. (New York: McGraw-Hill Book Company, 1936.) pp. 285.

Symonds concluded that thinking is a complex art which can be divided into components, each of which is a matter of skill and learning in itself. Previous experience, the words used, and the meaning they convey to the individual are important factors in thinking. Meager experience and concepts limit thinking.

Tyler[17] found that students engaged in the study of a variety of subjects did not develop corresponding degrees of facility in mere recall and in the abilities to apply principles and to draw inferences. The ability to apply principles and the ability to draw inferences Tyler considers higher mental processes.

Dean[18] tested fourth grade children in types of comprehension. The types tested were: reading for the main points; reading to reorganize material; reading to judge the relative importance of ideas; and reading to draw inferences from facts not overtly stated. The order of

---

[17] Ralph W. Tyler. "The Relation Between Recall and Higher Mental Processes", in Charles H. Judd, Education as Cultivation of the Higher Mental Processes, (New York: The Macmillan Company, 1936). Chapter II.

[18] Alice M. Dean, "A Study of the Range and Types of Comprehension in Fourth Grade Reading", Master of Arts Thesis, 1932. Reported by Gerald A. Yookum. "Research Studies in Work Type Reading: A Summary of Work Done at One University", Journal of Educational Research, 29: 532-543, March, 1936.

difficulty of the types of comprehension studied is as follows:

1. Reading for the main points - factual answers.
2. Reorganizing material.
3. Drawing inferences from facts not overtly stated.
4. Judging the relative importance of various facts.

It was found that all except the very bright children have more trouble with type four than with any other type of comprehension.

CHAPTER III

PROCEDURE USED IN THE STUDY

Classification of Higher Mental Processes

For the purposes of this study it was necessary to formulate a definite classification of the mental processes in which children might be expected to engage to answer the questions and to do the exercises set for them in fourth grade geography books. The classification of mental processes used in this study is based largely on the work in this field by Durrell[1] and Judd[2]. The classification used in this study is as follows:

I Recall
    A. Facts in the chapter
    B. Facts in previous chapters
    C. Previous knowledge or experience
    D. Reproduction of drawing
    E. Original drawing explained in text
    F. Recognition

---

[1] Donald D. Durrell, "Language and the Higher Mental Processes", Review of Educational Research, 13: 110-114, April, 1943.

[2] Charles Hubbard Judd, Education as Cultivation of the Higher Mental Processes, New York: The Macmillan Company, 1936. p. 106-137.

II Organization
    A. Select items pertinent to the topic
    B. Classify or arrange
    C. Find the main point
    D. Find minor points
    E. Make a summary
    F. Make an outline
    G. Prepare a special report
    H. Collect information, pictures, etc. from sources other than the textbooks
III Supplementation and use of ideas
    A. Find examples
    B. Suggest plan of activity allied to topic
    C. Suggest additional topics for study
    D. Show relationship to other fields
    E. Create or invent new combination of ideas
    F. Apply knowledge to new situations
    G. Relationship
    H. Handwork to illustrate a fact or a principle
IV Criticism and evaluation of ideas
    A. Recognizing special merit of ideas
    B. Find exception to point made
    C. Suggest limitations
    D. Analyze methods and motives
    E. Evaluate evidence
    F. Separate fact from opinion

G. Eliminate unimportant or irrelevant material

H. Make comparisons

I. Find differences

J. Find similarities

Sample Questions and Exercises of each item in the classification of mental processes used in this study

I Recall

A. Facts in the chapter

What kind of homes do the Eskimos have?

B. Facts in previous chapters

What other boy have you visited, besides Andre, whose father carries on mixed farming?

C. Previous knowledge or experience

Answer these from your own experience:

Have you ever been in a fog?

Have you ever seen an island?

D. Reproduction of drawing

Draw a picture of a Swiss cottage with a background of mountains.

E. Original drawing - explained in text

Draw a large circle to represent either the Western Hemisphere or the Eastern Hemisphere. Then draw lines to show the equator, the arctic and antarctic circles, and the tropics of Cancer and Capricorn. Write the

correct names on each of these lines.

Then write the names of the five zones in the correct places.

F. Recognition

The Eskimos keep many dogs because

- a. they need dogs for drawing their sledges.
- b. they are very fond of pets.
- c. the dogs scare away wild animals.

Point to the mouth of the Congo on this map.

Trace the Nile River from its source to its mouth.

II Organization of ideas

A. Select items pertinent to the topic.

None found.

B. Classify or arrange

During your travels you have visited two countries in Asia: Hirfa's country and Li Yung's country. Write these two headings on a sheet of paper or on the blackboard:

Hirfa's people	Li Yung's people

Then write each of the following phrases under the heading where you think it belongs. There should be eight phrases in each column. If you place them correctly, you will have clear memory pictures of your friends in Asia.

1. Belong to the yellow-brown race.
2. Belong to the white race.
3. Live in southeastern Asia.
4. Live in southwestern Asia.
5. Wear woolen clothing.
6. Wear cotton and silk clothing.
7. Live in houses.
8. Live in tents.
9. Eat rice and drink tea.
10. Eat dates and drink coffee.
11. Live in a desert.
12. Live in a land of many rivers.
13. Ride on horses and camels.
14. Travel in boats.
15. Sell silk and tea.
16. Sell woolen thread and cheese.

C. Find main point

None found

D. Find minor point

None found

E. Make a summary

None found

F. Make an outline

A little American girl took a trip from Como across Switzerland. She made notes about the things she saw as she looked out of the train

window during the first three hours of her journey. From her notes she made the following record of this part of her trip. Make notes for yourself of at least fifteen different things you could see.

G. Prepare a special report

Make a report about ancient Alexandria, its library and lighthouse.

H. Collect information, pictures, etc.

Collect pictures showing the life of the people in Egypt.

Try to find books that tell about Pompeii and how the people of that old Roman city lived.

If you can find an Italian friend or a Greek friend ask him to tell you about his old home and how the people live there.

Learn from other books all you can about the habits of the seal.

III Supplementation and use of ideas

A. Find examples.

None found.

B. Suggest plan or activity allied to the topic.

None found.

C. Suggest additional topics for study.

What questions about Bomba do you hope to have answered during your visit in his village?

D. Show relationship to other fields.

None found.

E. Create or invent new combination of ideas.

Write a brief story of your trip down the Nile.

Write a letter to your mother telling her about all the sights you have seen on the way.

Make up riddles like these.

Plan a little play in four acts about seal hunting in the wintertime.

F. Application of knowledge to new situations.

Do you expect to find the summer weather in Norway warmer than in the United States, or cooler? Why?

G. Relationship.

As you travel up and down the Amazon River try to think how the life of the Amazon Indian is related to the land in which they live.

H. Handwork to illustrate a fact or a principle.

Draw on the blackboard a set of pictures which will tell the story of a summer afternoon with the Eskimos at the trading post.

Make a model of a Kazak camp in the steppe. Show the grassy plain, the yurts, and the animals grazing in the pastures.

IV Criticism and evaluation of ideas

A. Recognizing special merit of ideas presented.

Write a paragraph telling why you think the Mediterranean Sea Coast would be a good place to spend a vacation.

B. Finding exceptions to point made.

None found.

C. Suggesting limitations.

None found.

D. Analyzing methods and motives.

Why do you think they landed when they did?

Can you figure out how the pump works?

E. Evaluating evidence.

Does the map make you think of any reason why it is hard to build railroads in Norway?

F. Separating fact from opinion.

None found.

G. Eliminating unimportant or irrelevant material.

None found.

H. Making comparisons.

How does the Red Sea compare in length with the Mediterranean?

Compare the uses of water buffaloes, camels, and donkeys.

I. Finding differences.

How does the Gulf Stream differ from the Labrador Current?

J. Finding similarities.

In what way does Amsterdam remind you of Venice?

In what ways is travel in Switzerland like that in the United States?

Books Used in the Study

Ten fourth grade geography books were chosen for use in this study. All of the questions and exercises contained in each book were analyzed and classified according to the mental processes required for their solution. The questions and exercises were analyzed and classified in two groups, as follows:

1. the questions and exercises found at the end of chapters or other definite sections of the text, and those found in the text;
2. the questions and exercises found under maps, pictures, and diagrams.

The ten books chosen for use in this study are as follows:

Atwood, Wallace W., and Thomas, Helen Goss, Home Life in Far Away Lands, Boston; Ginn and Company, 1938.

Atwood, Wallace W., and Thomas, Helen Goss. Visits in Other Lands. Boston: Ginn and Company, 1943.

Barrows, Harlan H., Parker, Edith Putnam. Journeys in Distant Lands. Boston: Silver Burdett Company, 1936.

Bodley, G. R. Peoples of Other Lands. New York: Iroquois Publishing Company, 1941.

Branom, Frederick K., and Ganey, Helen M. Our Lands and Far Lands. New York: William H. Sadlier, Inc., 1938.

Carpenter, Frances. Our Neighbors Near and Far. Boston: American Book Company, 1939.

Dodge, Richard Elwood, and Lackey, Earl Emmet. The World and its People. New York: Rand McNally and Company, 1932.

McConnell, W. R. Geography Around the World. New York: Rand McNally and Company, 1945.

Smith, Russell J. World Folks. Chicago: The John C. Winston Company, 1939.

Stull, DeForest, and Hatch, Roy W. Journeys Through Many Lands. Boston: Allyn and Bacon, 1942.

CHAPTER IV

ANALYSIS OF DATA

The following tables present the data on the classification of the questions and exercises in the ten geography books used in this study.

Table IA shows the numerical distribution of the questions and the exercises found in the text and at the end of chapters that were classified under the subdivision of Recall. There were 6,886 questions and exercises in the text and at the end of chapters classified under Recall. Of these, 3,302 were classified under recall of Facts in the chapter. Two thousand six hundred fifty-five questions and exercises were classified under Recognition. Four hundred ninety-two questions and exercises were classified under Facts in previous chapters. Three hundred forty-one questions and exercises were classified under Previous knowledge or experience. Seventy-four questions and exercises were classified under Original drawing explained in text. Twenty-two questions and exercises were classified under Reproduction of drawing.

TABLE IA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL

Book	Facts in the chapter	Facts in previous chapters	Previous knowledge or experience	Reproduction of drawing	Original drawing explained in text	Recognition	Total
1	139	1	30	0	6	114	290
2	465	103	20	0	9	342	939
3	357	94	26	0	11	322	810
4	584	62	64	2	8	375	1095
5	173	42	80	0	1	377	673
6	166	9	4	0	0	129	308
7	153	44	54	1	1	393	646
8	342	84	36	6	0	178	646
9	741	10	9	0	0	90	850
10	182	43	18	13	38	335	629
Total	3302	492	341	22	74	2655	6886

Table IIA shows the numerical distribution of the questions and exercises found in the text and at the end of chapters that were classified under the sub-divisions of Organization of ideas.

There were three hundred three questions and exercises in the text and at the end of chapters classified under Organization of ideas. Of these, two hundred eight questions and exercises were classified under Collect-information, pictures. Fifty-one questions and exercises were classified under Classify or Arrange. Forty-three questions and exercises were classified under Prepare a special report. One question was classified under Make an outline. No questions or exercises were classified under: Select items pertinent to the topic; Find main point; Find minor point; or Make a summary.

TABLE IIA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER SUB-DIVISIONS OF ORGANIZATION OF IDEAS

Book	Select items pertinent to the topic	Classify or arrange	Find main point	Find minor point	Make a summary	Make an outline	Prepare a special report	Collect information, pictures	Total
1	0	4	0	0	0	0	2	5	11
2	0	17	0	0	0	0	7	106	130
3	0	8	0	0	0	0	8	16	32
4	0	9	0	0	0	0	10	18	37
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	2	26	28
7	0	6	0	0	0	1	0	2	9
8	0	4	0	0	0	0	0	2	6
9	0	1	0	0	0	0	14	22	37
10	0	2	0	0	0	0	0	11	13
Total	0	51	0	0	0	1	43	208	303

Table IIIA shows the numerical distribution of questions and exercises found in the text and at the end of chapters that were classified under the sub-divisions of Supplementation and use of ideas.

There were five hundred fifty-three questions and exercises in the text and at the end of chapters classified under Supplementation and use of ideas. Of these, three hundred one questions and exercises were classified under Handwork to illustrate a fact or a principle. One hundred nineteen questions and exercises were classified under Create or invent new combination of ideas. Eighty-two questions and exercises were classified under Relationship. Forty-nine questions and exercises were classified under Application of knowledge to new situations. Two questions were classified under Suggest additional topics for study. There were no questions and exercises classified under: Find examples; Suggest plan or activity allied to topic; or Show relationship to other fields.

TABLE IIIA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS

Book	Find examples	Suggest plan or activity allied to topic	Suggest additional topics for study	Show relationship to other fields	Create or invent new combination of ideas	Application of knowledge to new situations	Relationship	Handwork to illustrate a fact or a principle	Total
1	0	0	0	0	15	1	1	15	32
2	0	0	0	0	0	4	20	118	142
3	0	0	2	0	0	14	8	22	46
4	0	0	0	0	40	21	0	87	148
5	0	0	0	0	0	1	6	9	16
6	0	0	0	0	7	0	4	10	21
7	0	0	0	0	28	0	11	11	50
8	0	0	0	0	12	6	2	15	35
9	0	0	0	0	0	2	23	1	26
10	0	0	0	0	17	0	7	13	37
Total	0	0	2	0	119	49	82	301	553

Table IVA shows the numerical distribution of questions and exercises found in the text and at the end of chapters that were classified under the sub-divisions of Criticism and evaluation of ideas.

There were eight hundred twenty-five questions and exercises in the text and at the end of chapters classified under Criticism and evaluation of ideas. Of these, two hundred thirty-six questions and exercises were classified under Finding differences. Two hundred thirty-four questions and exercises were classified under Making comparisons. One hundred forty-seven questions and exercises were classified under Finding similarities. One hundred twenty questions and exercises were classified under Evaluating evidence. Fifty questions and exercises were classified under Analyzing methods and motives. Twenty-two questions and exercises were classified under Recognizing special merit of ideas presented. Sixteen questions and exercises were classified under Suggesting limitations. No questions and exercises were classified under Finding exception to point made; Separating fact from opinion; or Eliminating unimportant or irrelevant material.

TABLE IVA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS

Book	Recognizing special merit of ideas presented	Finding exceptions to point made	Suggesting limitations	Analyzing methods and motives	Evaluating evidence	Separating fact from opinion	Eliminating unimportant or irrelevant material	Making comparisons	Finding differences	Finding similarities	Total
1	12	0	0	3	16	0	0	11	4	5	51
2	3	0	0	9	12	0	0	3	132	122	281
3	1	0	16	1	7	0	0	19	7	1	52
4	6	0	0	6	12	0	0	20	18	7	69
5	0	0	0	0	1	0	0	7	1	0	9
6	0	0	0	1	1	0	0	52	7	1	62
7	0	0	0	5	54	0	0	47	6	3	115
8	0	0	0	21	2	0	0	31	12	4	70
9	0	0	0	4	11	0	0	23	45	1	84
10	0	0	0	0	4	0	0	21	4	3	32
Total	22	0	16	50	120	0	0	234	236	147	825

Table IB shows the percentage distribution of the questions and exercises found in the text and at the end of chapters that were classified under Recall. There were 6,886 questions and exercises in the text and at the end of chapters classified under the sub-divisions of Recall. Of these 47.96 per cent were classified under recall of Facts in the chapter. Under Recognition were classified 38.56 per cent of the questions and exercises classified under Recall. Under Facts in previous chapters were classified 7.14 per cent of the questions and exercises classified under Recall. Under Previous knowledge or experience were classified 4.95 per cent of the questions and exercises classified under Recall. Under Original drawing explained in text were classified 1.07 per cent of the questions and exercises classified under Recall. Under Reproduction of drawing were classified 0.32 per cent of the questions and exercises classified under Recall.

TABLE IB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISION OF RECALL

Book	Facts in the chapter	Facts in previous chapters	Previous knowledge or experience	Reproduction of drawing	Original drawing explained in text	Recognition
1	47.93	0.34	10.35	0	2.07	39.31
2	49.52	10.97	2.13	0	0.96	36.42
3	44.08	11.60	3.21	0	1.36	39.75
4	53.33	5.66	5.85	0.18	0.73	34.25
5	25.70	6.24	11.89	0	0.15	56.02
6	53.90	2.92	1.30	0	0	41.88
7	23.69	6.81	8.36	0.15	0.15	60.84
8	52.94	13.00	5.57	0.93	0	27.56
9	87.18	1.18	1.06	0	0	10.58
10	28.93	6.84	2.86	2.07	6.04	53.26
Total	47.96	7.14	4.95	0.32	1.07	38.56

Table IIB shows the percentage distribution of the questions and exercises found in the text and at the end of chapters that were classified under the subdivisions of Organization of ideas. There were three hundred three questions and exercises in the text and at the end of chapters classified under Organization of ideas. Of these, 68.65 per cent were classified under Collect information, pictures. Under Classify or arrange were classified 16.83 per cent of the questions and exercises classified under Organization of ideas. Under Prepare a special report were classified 14.19 per cent of the questions and exercises classified under Organization of ideas. Under Make an outline were classified 0.33 per cent of the questions and exercises classified under Organization of ideas. No questions and exercises were classified under: Select items pertinent to the topic; Find main point; Find minor point; or Make a summary.

TABLE IIB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS

Book	Select items pertinent to the topic	Classify or arrange	Find main point	Find minor point	Make a summary	Make an outline	Prepare a special report	Collect information, pictures
1	0	36.36	0	0	0	0	18.18	45.46
2	0	13.08	0	0	0	0	5.38	81.54
3	0	25.00	0	0	0	0	25.00	50.00
4	0	24.32	0	0	0	0	22.03	48.65
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	7.15	92.85
7	0	66.67	0	0	0	11.11	0	22.22
8	0	66.67	0	0	0	0	0	33.33
9	0	2.70	0	0	0	0	37.84	59.46
10	0	15.38	0	0	0	0	0	84.62
Total	0	16.83	0	0	0	0.33	14.19	68.65

Table IIIB shows the percentage distribution of the questions and exercises found in the text and at the end of chapters that were classified under the sub-divisions of Supplementation and use of ideas. There were five hundred fifty-three questions and exercises in the text and at the end of chapters classified under Supplementation and use of ideas. Of these, 54.43 per cent were classified under Handwork to illustrate a fact or a principle. Under Create or invent new combination of ideas were classified 21.52 per cent of the questions and exercises classified under Supplementation and use of ideas. Under Relationship were classified 14.83 per cent of the questions and exercises classified under Supplementation and use of ideas. Under Application of knowledge to new situations were classified 8.84 per cent of the questions and exercises classified under Supplementation and use of ideas. Under Suggest additional topics for study were classified 0.36 per cent of the questions and exercises classified under Supplementation and use of ideas. There were no questions or exercises classified under: Find examples; Suggest plan or activity allied to topic; or Show relationship to other fields.

TABLE IIIB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS

Book	Find examples	Suggest plan or activity allied to topic	Suggest additional topics for study	Show relationship to other fields	Create or invent new combination of ideas	Application of knowledge to new situations	Relationship	Handwork to illustrate a fact or a principle
1	0	0	0	0	46.88	3.12	3.12	46.88
2	0	0	0	0	0	2.82	14.08	83.10
3	0	0	4.35	0	0	30.43	17.39	47.83
4	0	0	0	0	27.03	14.19	0	58.78
5	0	0	0	0	0	6.25	37.50	56.25
6	0	0	0	0	33.33	0	19.05	47.62
7	0	0	0	0	56.00	0	22.00	22.00
8	0	0	0	0	34.29	17.14	5.71	42.86
9	0	0	0	0	0	7.70	88.45	3.85
10	0	0	0	0	45.95	0	18.92	35.13
Total	0	0	0.36	0	21.52	8.86	14.83	54.43

Table IVB shows the percentage distribution of the questions and exercises found in the text and at the end of chapters that were classified under the sub-divisions of Criticism and evaluation of ideas. There were eight hundred twenty-five questions and exercises in the text and at the end of chapters classified under Criticism and evaluation of ideas. Of these, 28.61 per cent were classified under Finding differences. Under Making comparisons were classified 28.36 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Finding similarities were classified 17.82 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Evaluating evidence were classified 14.54 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Analyzing methods and motives were classified 6.06 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Recognizing special merit of ideas presented were classified 2.67 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Suggesting limitations were classified 1.94 per cent of the questions and exercises classified under Criticism and evaluation of ideas. No questions were classified under: Finding exception to point made; Separating fact from opinion; or Eliminating unimportant or irrelevant material.

TABLE IVB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS

Book	Recognizing special merit of ideas presented	Finding exceptions to point made	Suggesting limitations	Analyzing methods and motives	Evaluating evidence	Separating fact from opinion	Eliminating unimportant or irrelevant material	Making comparisons	Finding differences	Finding similarities
1	23.53	0	0	5.88	31.37	0	0	21.57	7.84	9.81
2	1.07	0	0	3.20	4.27	0	0	1.07	47.33	43.06
3	1.92	0	30.77	1.92	13.47	0	0	36.53	13.47	1.92
4	8.70	0	0	8.70	17.40	0	0	28.98	26.08	10.14
5	0	0	0	0	11.11	0	0	77.78	11.11	0
6	0	0	0	1.61	1.61	0	0	83.87	11.30	1.61
7	0	0	0	4.35	46.95	0	0	40.87	5.22	2.61
8	0	0	0	30.00	2.86	0	0	44.29	17.14	5.71
9	0	0	0	4.76	13.09	0	0	27.39	53.57	1.19
10	0	0	0	0	12.50	0	0	65.62	12.50	9.38
Total	2.67	0	1.94	6.06	14.54	0	0	28.36	28.61	17.82

Table VA shows the numerical distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Recall. There were 800 questions and exercises under maps, pictures, and diagrams classified under Recall. Of these, 595 questions and exercises were classified under Recognition. One hundred nineteen questions and exercises were classified under Facts in the chapter. Fifty-six questions and exercises were classified under Previous knowledge or experience. Twenty-eight questions and exercises were classified under Facts in previous chapters. Two questions and exercises were classified under Reproduction of drawing. There were no questions or exercises classified under Original drawing explained in text.

TABLE VA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL

Book	Facts in the chapter	Facts in previous chapters	Previous knowledge or experience	Reproduction of drawing	Original drawing explained in text	Recognition	Total
1	11	4	21	0	0	85	121
2	14	3	0	0	0	149	166
3	33	20	11	0	0	167	231
4	52	0	12	2	0	122	188
5	1	0	1	0	0	8	10
6	8	0	10	0	0	34	52
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	1	1	0	0	30	32
10	0	0	0	0	0	0	0
Total	119	28	56	2	0	595	800

Table VIA shows the numerical distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Organization of ideas. There were 3 questions and exercises under maps, pictures, and diagrams classified under Organization of ideas. Of these, two questions and exercises were classified under Collect information, pictures. One question was classified under Classify or arrange. There were no questions or exercises classified under: Select items pertinent to the topic; Find main point; Find minor point; Make a summary; Make an outline; or Prepare a special report.

TABLE VIA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS

Book	Select items pertinent to the topic	Classify or arrange	Find main point	Find minor point	Make a summary	Make an outline	Prepare a special report	Collect information, pictures	Total
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	1	0	0	0	0	0	2	3
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	2	3

Table VIIA shows the numerical distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Supplementation and use of ideas. There were 15 questions and exercises under maps, pictures, and diagrams classified under Supplementation and use of ideas. Of these, 7 questions and exercises were classified under Relationship. Six questions and exercises were classified under Create or invent new combination of ideas. One question was classified under Application of knowledge to new situations. One question was classified under Handwork to illustrate a fact or a principle. There were no questions or exercises classified under: Find examples; Suggest plan or activity allied to topic; Suggest additional topics for study; or Show relationship to other fields.

TABLE VIIA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS

Book	Find examples	Suggest plan or activity allied to topic	Suggest additional topics for study	Show relationship to other fields	Create or invent new combination of ideas	Application of knowledge to new situations	Relationship	Handwork to illustrate a fact or a principle	Total
1	0	0	0	0	0	0	3	0	3
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	3	0	4
4	0	0	0	0	6	0	1	1	8
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	6	1	7	1	15

Table VIIIA shows the numerical distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Criticism and evaluation of ideas. There were 98 questions and exercises classified under Criticism and evaluation of ideas. Of these, 51 questions and exercises were classified under Evaluating evidence. Thirty questions and exercises were classified under Making comparisons. Eight questions and exercises were classified under Finding differences. Five questions and exercises were classified under Recognizing special merit of ideas presented. Three questions and exercises were classified under Analyzing methods and motives. One question was classified under Suggesting limitations. There were no questions and exercises classified under: Finding exception to point made; Separating fact from opinion; Eliminating unimportant or irrelevant material; or Finding similarities.

TABLE VIIIA

NUMERICAL DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS

Book	Recognizing special merit of ideas presented	Finding exceptions to point made	Suggesting limitations	Analyzing methods and motives	Evaluating evidence	Separating fact from opinion	Eliminating unimportant or irrelevant material	Making comparisons	Finding differences	Finding similarities	Total
1	5	0	0	0	25	0	0	2	2	0	34
2	0	0	0	0	10	0	0	6	0	0	16
3	0	0	0	0	0	0	0	5	3	0	8
4	0	0	0	0	11	0	0	8	3	0	22
5	0	0	0	1	0	0	0	3	0	0	4
6	0	0	0	0	5	0	0	4	0	0	9
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	1	2	0	0	0	2	0	0	5
10	0	0	0	0	0	0	0	0	0	0	0
Total	5	0	1	3	51	0	0	30	8	0	98

Boston University
School of Education
Library

Table VB shows the percentage distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Recall. There were 800 questions and exercises under maps, pictures and diagrams classified Recall. Of these, 74.38 per cent were classified under Recognition. Under Facts in the chapter were classified 14.87 per cent of the questions and exercises classified under Recall. Under Previous knowledge or experience were classified 7.00 per cent of the questions and exercises classified under Recall. Under Facts in previous chapters were classified 3.50 per cent of the questions and exercises classified under Recall. Under Reproduction of drawing were classified 0.25 per cent of the questions and exercises classified under Recall. There were no questions or exercises classified under Original drawing explained in text.

TABLE VB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF RECALL

Book	Facts in the chapter	Facts in previous chapters	Previous knowledge or experience	Reproduction of drawing	Original drawing explained in text	Recognition
1	9.09	3.31	17.35	0	0	70.25
2	8.43	1.81	0	0	0	89.76
3	14.29	8.66	4.76	0	0	72.29
4	27.66	0	6.38	1.07	0	64.89
5	10.00	0	10.00	0	0	80.00
6	15.39	0	19.23	0	0	65.38
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	3.125	3.125	0	0	93.75
10	0	0	0	0	0	0
Total	14.87	3.50	7.0	0.25	0	74.38

Table VIB shows the percentage distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Organization of ideas. There were three questions and exercises under maps, pictures, and diagrams classified under Organization of ideas. Of these 66.67 per cent were classified under Collect information, pictures. Under Classify or arrange were classified 33.33 per cent of the questions and exercises classified under Organization of ideas. There were no questions or exercises classified under: Select items pertinent to the topic; Find main point; Find minor point; Make a summary; Make an outline; or Prepare a special report.

TABLE VIB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF ORGANIZATION OF IDEAS

Book	Select items pertinent to the topic	Classify or arrange	Find main point	Find minor point	Make a summary	Make an outline	Prepare a special report	Collect information, pictures
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	33.33	0	0	0	0	0	66.67
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
Total	0	33.33	0	0	0	0	0	66.67

Table VIIB shows the percentage distribution of the questions and exercises found under maps, pictures, and diagrams that were classified under the sub-divisions of Supplementation and use of ideas. There were 15 questions and exercises under maps, pictures and diagrams classified under Supplementation and use of ideas. Of these 46.66 per cent were classified under Relationship. Under Create or invent new combination of ideas were classified 40.00 per cent of the questions and exercises classified under Supplementation and use of ideas. Under Application of knowledge to new situations were classified 6.67 per cent of the questions and exercises classified under Supplementation and use of ideas. Under Handwork to illustrate a fact or a principle were classified 6.67 per cent of the questions and exercises classified under Supplementation and use of ideas. There were no questions and exercises classified under Suggest plan or activity allied to topic; Suggest additional topics for study; or Show relationship to other fields.

TABLE VIIB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF SUPPLEMENTATION AND USE OF IDEAS

Book	Find examples	Suggest plan or activity allied to topic	Suggest additional topics for study	Show relationship to other fields	Create or invent new combination of ideas	Application of knowledge to new situations	Relationship	Handwork to illustrate a fact or a principle
1	0	0	0	0	0	0	100	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	25.00	75.00	0
4	0	0	0	0	75.00	0	12.50	12.50
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
Total	0	0	0	0	40.00	6.67	46.66	6.67

Table VIIIB shows the percentage distribution of questions and exercises under maps, pictures, and diagrams classified under the sub-divisions of Criticism and evaluation of ideas. There were 98 questions and exercises classified under Criticism and evaluation of ideas. Of these, 52.05 per cent were classified under Evaluating evidence. Under Making comparisons were classified 30.61 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Finding differences were classified 8.17 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under recognizing special merit of ideas Presented were classified 5.10 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Analyzing methods and motives were classified 3.06 per cent of the questions and exercises classified under Criticism and evaluation of ideas. Under Suggesting limitations were classified 1.02 per cent of the questions and exercises classified under Criticism and evaluation of ideas. There were no questions and exercises classified under: Finding exception to point made; Separating fact from opinion; Eliminating unimportant or irrelevant material; or Finding similarities.

TABLE VIIIB

PERCENTAGE DISTRIBUTION OF QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS CLASSIFIED UNDER THE SUB-DIVISIONS OF CRITICISM AND EVALUATION OF IDEAS

Book	Recognizing special merit of ideas presented	Finding exceptions to point made	Suggesting limitations	Analyzing methods and motives	Evaluating evidence	Separating fact from opinion	Eliminating unimportant or irrelevant material	Making comparisons	Finding differences	Finding similarities
1	14.71	0	0	0	73.53	0	0	5.88	5.88	0
2	0	0	0	0	62.50	0	0	37.50	0	0
3	0	0	0	0	0	0	0	62.50	37.50	0
4	0	0	0	0	50.00	0	0	36.36	13.64	0
5	0	0	0	25.00	0	0	0	75.00	0	0
6	0	0	0	0	55.56	0	0	44.44	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	20.00	40.00	0	0	0	40.00	0	0
10	0	0	0	0	0	0	0	0	0	0
Total	5.10	0	1.02	3.06	52.04	0	0	30.61	8.17	0

Table IXA shows the numerical distribution of the questions and exercises found in the text and at the end of chapters classified under the main divisions: Recall; Organization of ideas; Supplementation and Use of ideas; and Criticism and evaluation of ideas.

TABLE IXA

NUMERICAL DISTRIBUTION OF THE QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas	Total
1	290	11	32	51	384
2	939	130	142	281	1492
3	810	32	46	52	940
4	1095	37	148	69	1349
5	673	0	16	9	698
6	308	28	21	62	419
7	646	9	50	115	820
8	646	6	35	70	757
9	850	37	26	84	997
10	629	13	37	32	711
Total	6886	303	553	825	8567

Table IXB shows the percentage distribution of the questions and exercises found in the text and at the end of chapters classified under the main divisions: Recall; Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas.

TABLE IXB

PERCENTAGE DISTRIBUTION OF THE QUESTIONS AND EXERCISES IN THE TEXT AND AT THE END OF CHAPTERS UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas
1	75.52	2.87	8.33	13.28
2	62.94	8.71	9.51	18.84
3	86.17	3.41	4.89	5.53
4	81.17	2.74	10.97	5.12
5	96.42	0	2.29	1.29
6	73.51	6.69	5.00	14.80
7	78.78	1.10	6.10	14.02
8	85.34	0.79	4.62	9.25
9	85.26	3.71	2.61	8.42
10	88.47	1.83	5.20	4.50

Table XA shows the numerical distribution of the questions and exercises found under maps, pictures, and diagrams classified under the main divisions: Recall; Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas.

TABLE XA

NUMERICAL DISTRIBUTION OF THE QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, AND DIAGRAMS UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas	Total
1	121	0	3	34	158
2	166	0	0	16	182
3	231	0	4	8	243
4	188	3	8	22	221
5	10	0	0	4	14
6	52	0	0	9	61
7	0	0	0	0	0
8	0	0	0	0	0
9	32	0	0	5	37
10	0	0	0	0	0
Total	800	3	15	98	916

Table XB shows the percentage distribution of the questions and exercises found under maps, pictures, and diagrams, classified under the main divisions: Recall, Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas.

TABLE XB

PERCENTAGE DISTRIBUTION OF THE QUESTIONS AND EXERCISES UNDER MAPS, PICTURES, and DIAGRAMS UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation of ideas	Criticism and evaluation of ideas
1	76.59	0	1.89	21.52
2	91.21	0	0	8.79
3	95.06	0	1.65	3.29
4	85.07	1.36	3.62	9.95
5	71.43	0	0	28.57
6	85.25	0	0	14.75
7	0	0	0	0
8	0	0	0	0
9	86.49	0	0	13.51
10	0	0	0	0

Table XIA shows the numerical distribution of the total number of questions and exercises in the ten books under the main classifications: Recall; Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas.

TABLE XIA

NUMERICAL DISTRIBUTION OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas	Total
1	411	11	35	85	542
2	1105	130	142	297	1674
3	1041	32	50	60	1183
4	1283	40	156	91	1570
5	683	0	16	13	712
6	360	28	21	71	480
7	646	9	50	115	820
8	646	6	35	70	757
9	882	37	26	89	1034
10	629	13	37	32	711
Total	7686	306	568	923	9483

Table XIB shows the percentage distribution of the total number of questions and exercises in the ten books under the main classifications: Recall; Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas.

TABLE XIB

PERCENTAGE DISTRIBUTION OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES UNDER THE MAIN CLASSIFICATIONS

Book	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas
1	75.83	2.03	6.46	15.68
2	66.01	7.77	8.48	17.74
3	88.00	2.70	4.22	5.07
4	81.72	2.55	9.94	5.79
5	95.93	0	2.25	1.82
6	75.78	5.83	4.38	14.79
7	78.78	1.10	6.10	14.02
8	85.34	0.79	4.62	9.25
9	85.30	3.58	2.51	8.61
10	88.47	1.83	5.20	4.50

Table XII shows the numerical and the percentage distributions of the total number of questions and exercises in the ten books used in this study under the main classifications: Recall; Organization of ideas; Supplementation and use of ideas; and Criticism and evaluation of ideas. There were nine thousand four hundred eighty-three questions and exercises in the ten books used in this study. Of these, seven thousand six hundred eighty-six questions and exercises, or 81.05 per cent, were classified as Recall. Nine hundred twenty-three questions and exercises, or 9.73 per cent, were classified as Criticism and evaluation of ideas. Five hundred sixty-eight questions and exercises, or 5.99 per cent, were classified as Supplementation and use of ideas. Three hundred six questions and exercises, or 3.23 per cent, were classified as Organization of ideas.

TABLE XII

NUMERICAL AND PERCENTAGE DISTRIBUTIONS OF THE TOTAL NUMBER OF QUESTIONS AND EXERCISES IN THE TEN BOOKS USED IN THIS STUDY

	Recall	Organization of ideas	Supplementation and use of ideas	Criticism and evaluation of ideas	Total number of questions and exercises
Total number of questions and exercises	7686	306	568	923	9483
Per cent of questions and exercises	81.05	3.23	5.99	9.73	

CHAPTER V

SUMMARY AND CONCLUSIONS

The purposes of this study were:

1. to classify the questions and exercises in fourth grade geography books on the basis of the mental processes required to answer the questions and to do the exercises;
2. to learn to what extent the questions and exercises in fourth grade geography books require the use of higher mental processes as defined in this study.

In this study the term mental processes is used to mean those mental activities in which children engage in order to answer the questions and to do the exercises set for them in fourth grade geography books.

The term higher mental processes is used in this study to designate those mental activities included in this study other than recall, namely: organization of ideas; supplementation and use of ideas; and criticism and evaluation of ideas.

A classification of the mental processes in which children might be expected to engage in order to answer the questions and to do the exercises in fourth grade geography books was prepared. Ten fourth grade geography books were

selected for use in this study. All the questions and exercises in the ten books were analyzed and classified.

The conclusions of the study are as follows:

1. The study revealed that there were nine thousand four hundred eighty-three questions and exercises in the ten geography books.
2. There were seven thousand six hundred eighty-six questions and exercises classified as Recall.
3. There were one thousand, seven hundred ninety-seven questions and exercises classified as requiring the use of higher mental processes for their solution.
4. Of the total questions and exercises 81.05 per cent were classified as Recall.
5. Of the total questions and exercises 18.95 per cent were classified as requiring the higher mental processes.

Studies previously reported herein indicate that training in the use of higher mental processes is effective under proper conditions. Furthermore, it is the opinion of many educators that such training must be provided in the schools if the adult population is to be able to do the problem solving necessary in a democracy. The present study reveals that the contribution of the ten geography books used in this study to training in the higher mental processes is negligible. Therefore, in the opinion of the

writer, it is necessary for the teacher to use a great deal of supplementary material in order to provide the proper learning experiences necessary for training in the use of the higher mental processes.

SELECTED BIBLIOGRAPHY

Books

Anderson, Howard R., (Editor), "Teaching Critical Thinking in the Social Studies." Thirteenth Yearbook of the National Council for the Social Studies, Washington, D. C.: National Education Association, 1942. 174 pp.

Davis, Robert A., The Psychology of Learning, New York: McGraw-Hill Book Company, Inc., 1935. 489 pp.

Dewey, John, How We Think, Boston: D. C. Heath and Company, 1910. 292 pp.

Fletcher, John Madison, Psychology With Emphasis on Creative Thinking, Garden City, New York: Doubleday Doran and Company, 1934. 524 pp.

Horn, Ernest, Methods of Instruction in the Social Studies, New York: Charles Scribner's Sons, 1937. 509 pp.

Jensen, Kai, "The Social Studies," Thirty-Eighth Yearbook of the National Society for the Study of Education, Part I, Bloomington, Illinois: Public School Publishing Company, 1939. Pp. 325-360.

Judd, Charles Hubbard, Education as Cultivation of the Higher Mental Processes, New York: The Macmillan Company, 1936. 201 pp.

Leonard, J. Paul, and Alvin C. Eurich, (Editors), An Evaluation of Modern Education, New York: D. Appleton-Century Company, 1942. 299 pp.

Saucier, William A., Theory and Practice in the Elementary School, New York: The Macmillan Company, 1941. 537 pp.

Symonds, Percival M., Education and the Psychology of Thinking, New York: The McGraw-Hill Book Company, Inc., 1936. 285 pp.

Stormzand, M. J., and Robert H. Lewis, New Methods in the Social Studies, New York: Farrar and Rinehart, Inc., 1935. 223 pp.

BIBLIOGRAPHY (Continued)

Terman, L. M., and M. A. Merrill, *Measuring Intelligence*, New York: Houghton Mifflin Company, 1937. 460 pp.

Wesley, Edgar Bruce, "Diagnosis in the Social Studies," *Thirty-fourth Yearbook of the National Society for the Study of Education*, Bloomington, Illinois: Public School Publishing Company, 1935. 563 pp.

Wilson, Howard E., and Wilbur F. Murra, "Contributions of Research to Special Methods: The Social Studies", *Thirty-seventh Yearbook of the National Society for the Study of Education*, Bloomington, Illinois: Public School Publishing Company, 1938. 529 pp.

Wrightstone, J. Wayne, *Appraisal of Newer Elementary School Practice*, New York: Columbia University Press, 1938. 221 pp.

Periodicals

Anderson, Howard C., *et al*, "An Experiment in Teaching Certain Skills in Critical Thinking." *Journal of Educational Research*, 38: 241-251, December, 1944.

Arnold, Dwight L., "Social Studies Education in the Intermediate Grades", *Social Education*, 7: 117-120, March, 1943.

———————— "Testing Ability to Use Data in the Fifth and Sixth Grades", *Educational Research Bulletin*, 17: 255-94, December 7, 1938.

Barham, Thomas C., "A Social Studies Unit that Developed Pupils' Powers of Problem Solving", *Clearing House*, 12: 33-36. September, 1937.

Burt, C., "The Development of Reasoning in School Children", *Journal of Experimental Pedagogy*, 5: 67-77, 121-127, 1920.

Carroll, R. P., "Can Reasoning Be Taught?" *Journal of Education*, 114: 17-21. 1931.

BIBLIOGRAPHY (Continued)

Dean, Alice M., "A Study of the Range and Type of Comprehension in Fourth Grade Reading", reported by Gerald A. Yoakum in "Research Studies in Worktype Reading: A Summary of Work Done at one University", Journal of Educational Research, 29: 532-43, March, 1936.

Durrell, Donald D., "Language and the Higher Mental Processes," Review of Educational Research, 13: 110-114, April, 1943.

Fahey, G. L., and S. M. Corey, "Inferring Level of Mental Activity from Pupils' Classroom Questions", Journal of Educational Research, 35: 193-200, November, 1941.

Grim, P. R., "Interpretation of Data and Reading Ability in the Social Studies", Educational Research Bulletin, 19: 372-74, September 25, 1940.

Herrick, J. H., "The Evaluation of Certain Aspects of Thinking in the Social Studies", Educational Method, 15: 422-26, May, 1936.

Holtman, Robert B., "Social Thinking in Wartime", Social Education, 7: 262-4, October, 1943.

Minton, Arthur, "A Method for Teaching Thinking", English Journal, 27: 660-66, October, 1938.

Raths, Louis, "A Thinking Test", Educational Research Bulletin, 23: 72-754, March 15, 1944.

Rothenbush, Verona F., "Plan For Teaching Pupils How to Think", Clearing House, 17:331-5, February, 1943.

Salisbury, Rachael, "A Study of the Transfer Effects of Training in Logical Organization", Journal of Educational Research, 28: 241-54, December, 1934.

Selberg, E. M., and J. D. Bernard, "Teaching Pupils the Method for Solving Problems", Educational Method, 16: 413-16, May, 1937.

Teller, J. D., "Improving Ability to Interpret Educational Data", Educational Research Bulletin, 19: 363-71, September 25, 1940.

Thorndike, Edward L., "Reading as Reasoning", Journal of Educational Psychology, 8: 323-32. June, 1917.

BIBLIOGRAPHY (Continued)

Turner, Charles S., "Changing Content in Elementary Social Studies", Social Education, 5: 600-603, December, 1941.

Tyler, Ralph W., "Measuring the Ability to Infer", Educational Research Bulletin, 9: 475: 480, November 19, 1930.

Young, William E., "Recent Research on Reading in the Social Studies", Education, 62: 18-26, September, 1941.

Dissertations and Theses

Alpert, Augusta, The Solving of Problem Situations by Pre-School Children: An Analysis. Columbia University Contribution to Education No. 323. New York: Columbia University Press, 1928, 69 pp.

Courtney, Douglas, Recall by Reproduction, Unpublished Master's Thesis. Boston University, 1941. 32 pp.

Daily, B. W., Ability of High School Pupils to Select Essential Data in Solving Problems. Columbia University Contribution to Education No. 190. New York: Columbia University Press, 1925. 102 pp.

Deutsche, Jean Marquis, The Development of Children's Concepts of Causal Relations. Minneapolis: The University of Minnesota Press, 1937. 104 pp.

Gans, Roma, Critical Reading Comprehension in the Intermediate Grades. Columbia University Contribution to Education No. 811. New York: Columbia University Press, 1940. 135 pp.

Glaser, Edward M., An Experiment in the Development of Critical Thinking. Columbia University Contribution to Education No. 843. New York: Columbia University Press, 1941. 212 pp.

Helseth, E. O., Children's Thinking. Columbia University Contribution to Education No. 209.. New York: Columbia University Press, 1926. 162 pp.

Marden, Avis, Associational Reading Abilities of the Seventh Grades. Unpublished Master's Thesis. Boston University, 1941. 232 pp.

BIBLIOGRAPHY (Continued)

Matthews, C. O., The Grade Placement of Curriculum. Materials in the Social Studies. Columbia University Contribution to Education No. 241. New York: Columbia University Press, 1926. 152 pp.

Salisbury, Rachael. Better Work Habits in College. A Practice Book on the Thought Side of Reading and Comprehension. Chicago: Scott, Foresman and Company, 1933. 179 pp.

"Education and Social Reconstruction; Need to Teach Clear Thinking", Times Education Supplement, 1511: 183. April 15, 1944.

Date Due

OCT 1 8 1958
APR 29 1959
MAY 5 1959
MAY 1 1959
MAY 12 1959
MAY
MAY 17 1960
OCT 8 1960
NOV 3 1962
NOV 1 1962
MAY 18 1963
AUG 20 1963
JAN 12
MAR 20

Demco 293-5

BOSTON UNIVERSITY
1 1719 02479 6429

Service Paper
Phillips,L.D.
1945
Phillips,L.D.
Analysis and classification of
questions and exercises in...

DATE
ISSUED TO

2 1 1 3 5 1

Ed

Service
Paper
Phillips,L
1945

ACCOPRESS BINDER

BFS 250 P7